Status of the Geostationary Earth Radiation Budget (GERB) experiment

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Contents

1. What is GERB?
2. Launch on MSG
3. First Results
4. Commissioning and the Future

What is GERB?

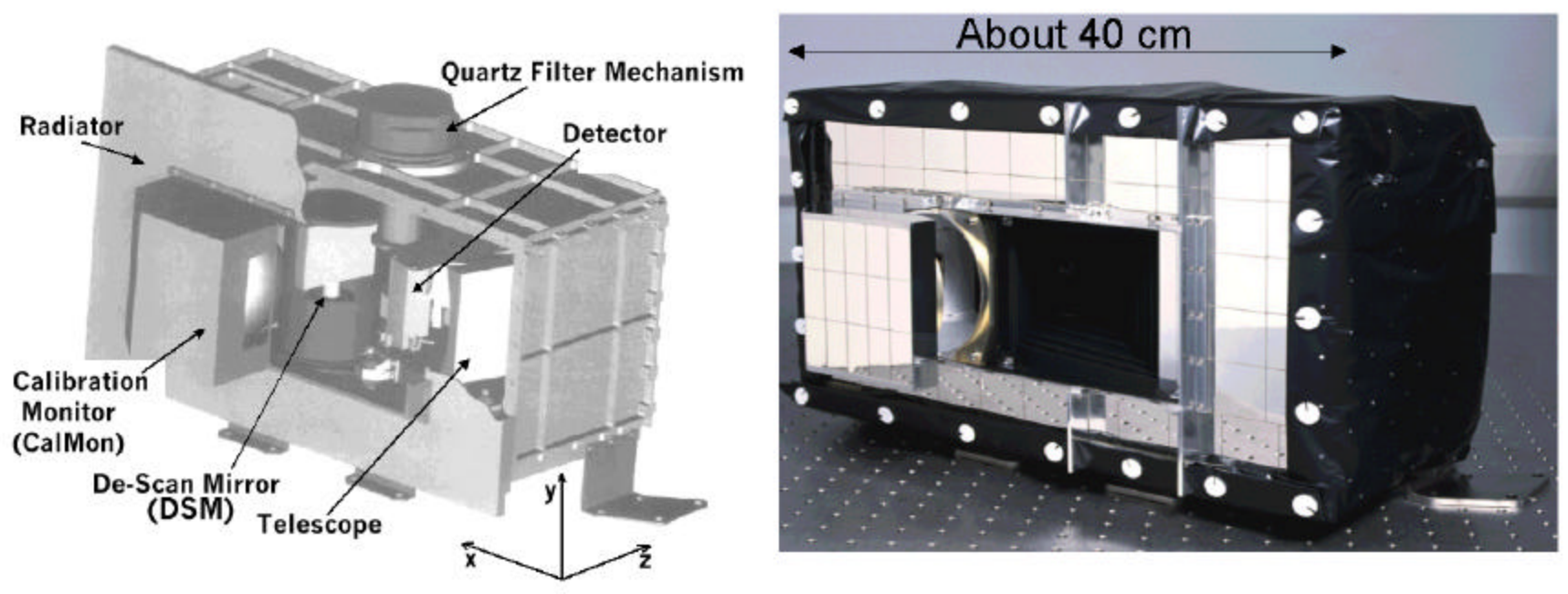
•GERB is a de-spun (MSG spins at 100 rpm: 18g!!) absolute radiometer seeking to achieve absolute accuracies (target ±0.5-1%). High time resolution (15 mins) for first time.

•Calibration in new facility at IC; GERB-1, -2 and –3 have been designed, built,tested and calibrated;

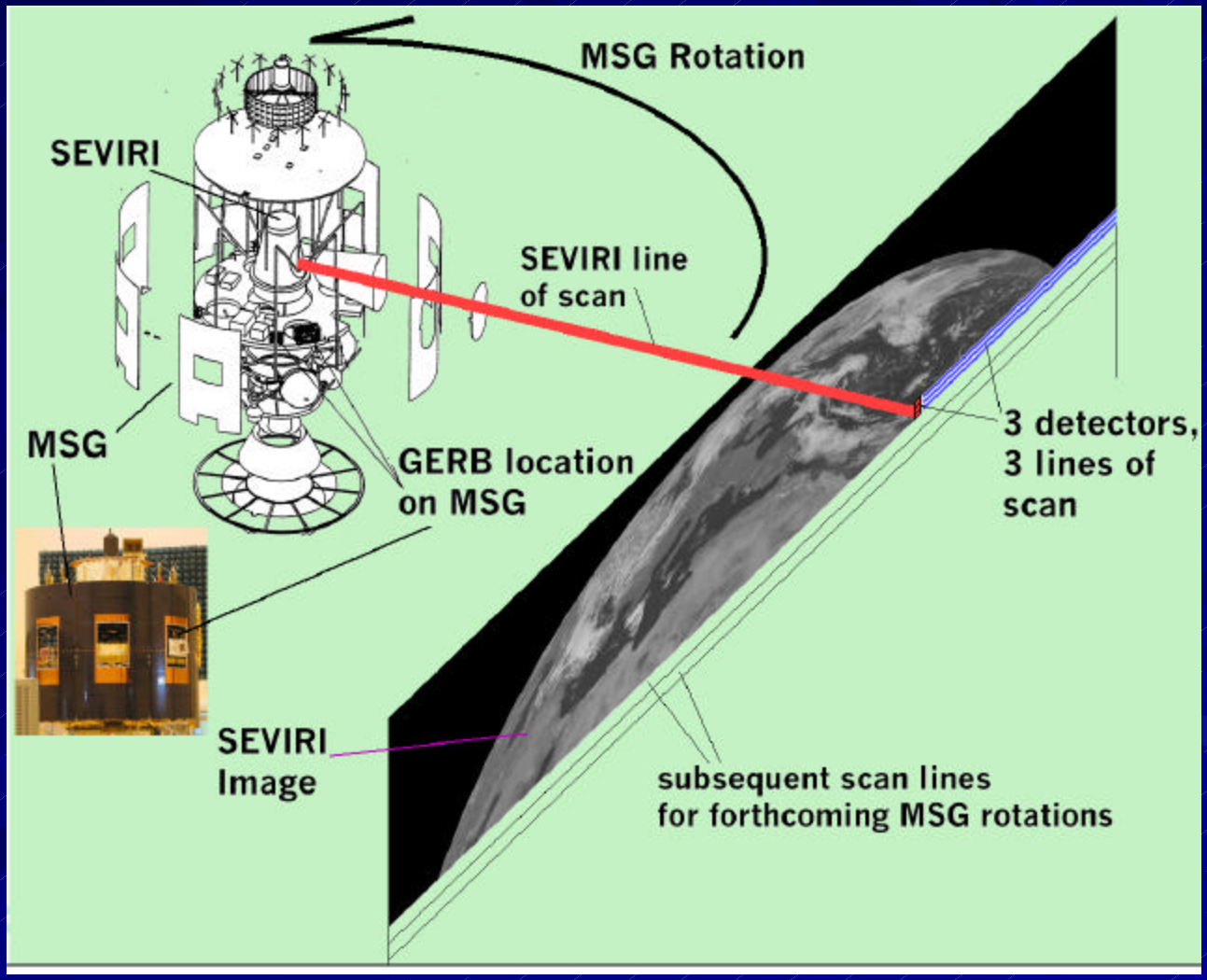
•Imperial team: John Harries PI, Steve Kellock, Jacqui Russell, Jenny Hanafin, James Rufus, Jo George and Grant Matthews. RAL leads technical project.

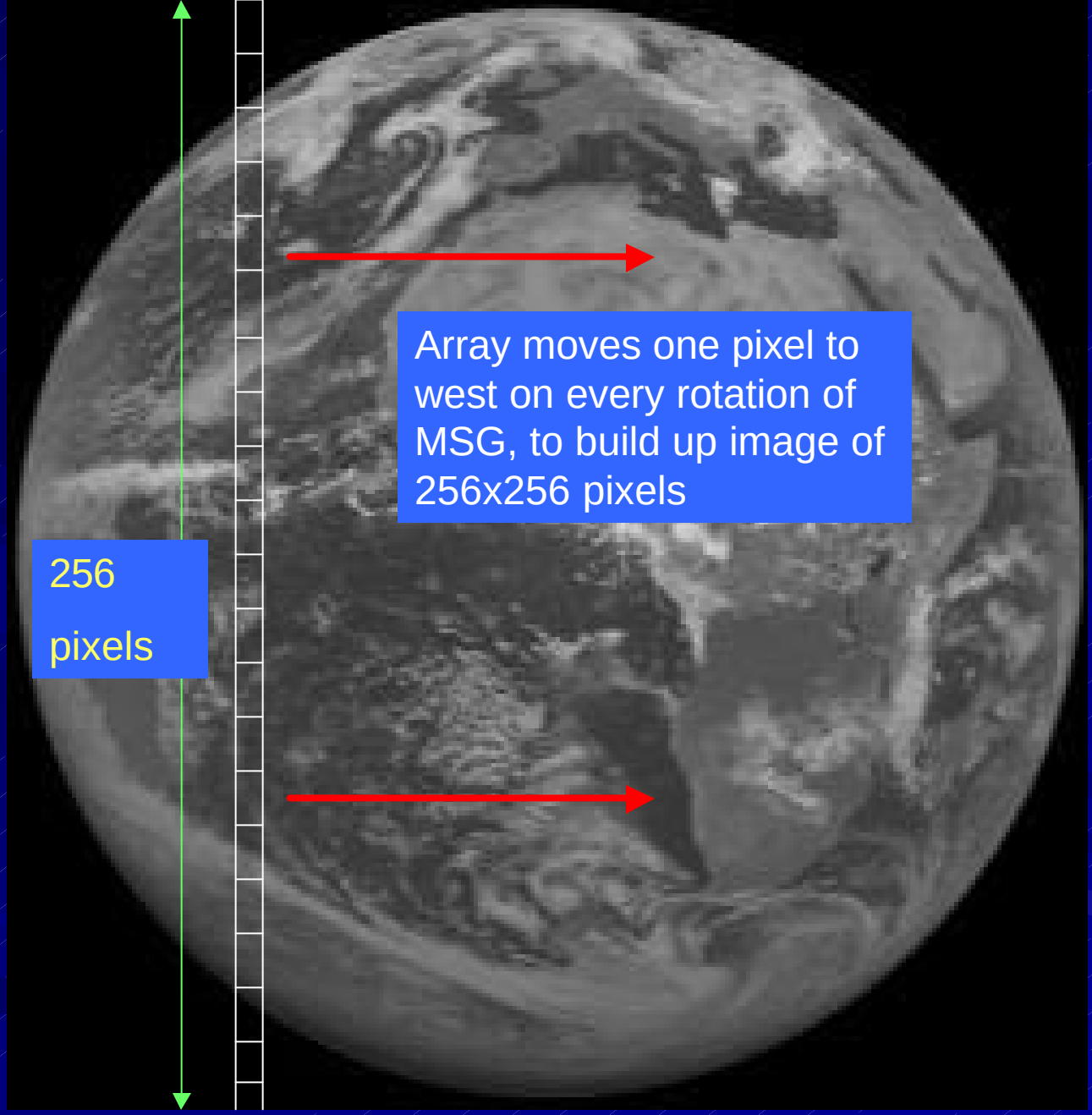
• GIST (GERB International Science Team) led by PI includes many world experts in ERB and EO studies.

- GERB will make the first ever measurements of the Earth's total energy balance from geostationary orbit.
- High accuracy measurements of the solar radiation absorbed, and the infrared energy emitted by the Earth will be produced each 15 minutes.

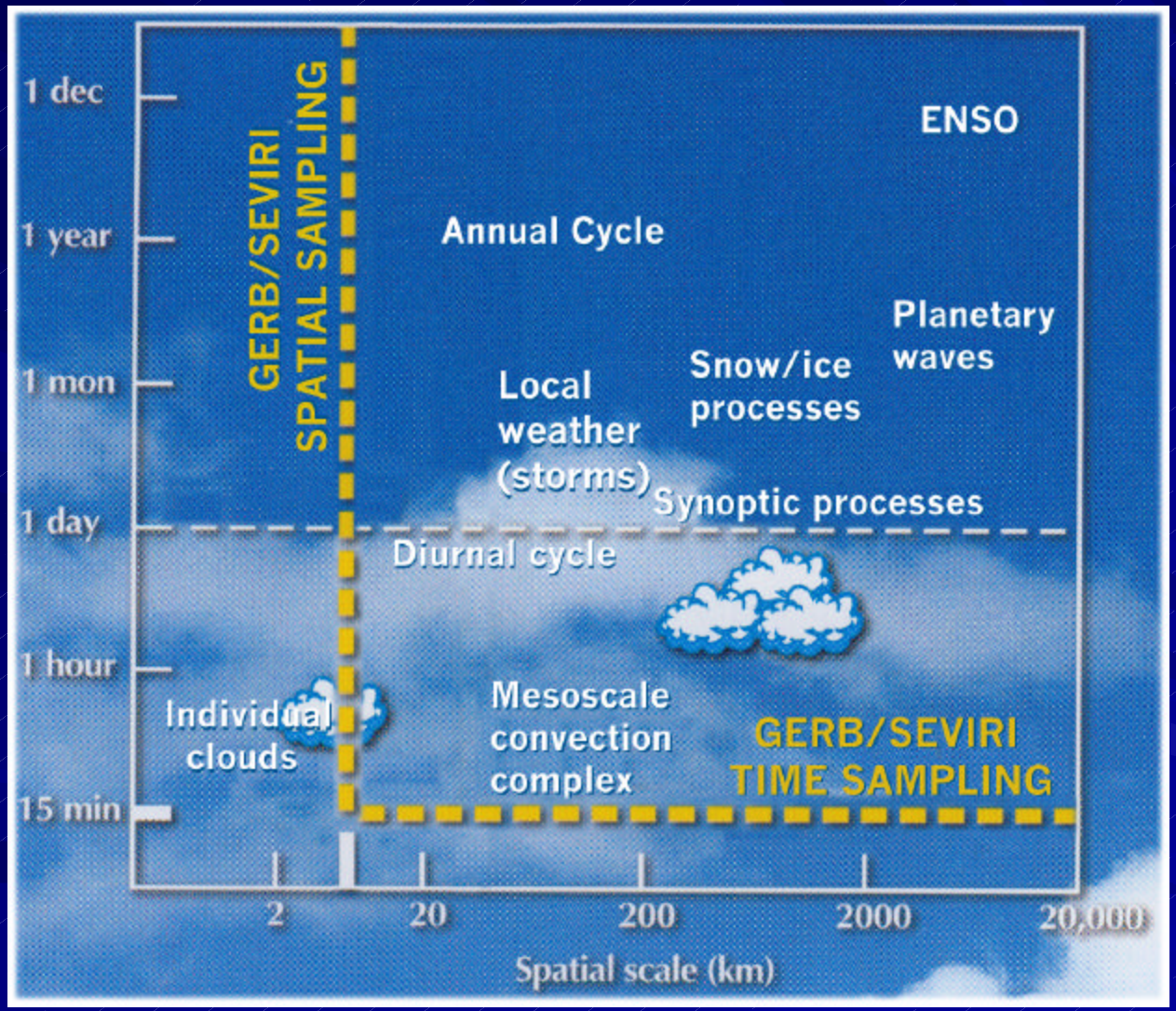


GERB Synergy with SEVIRI, also on MSG



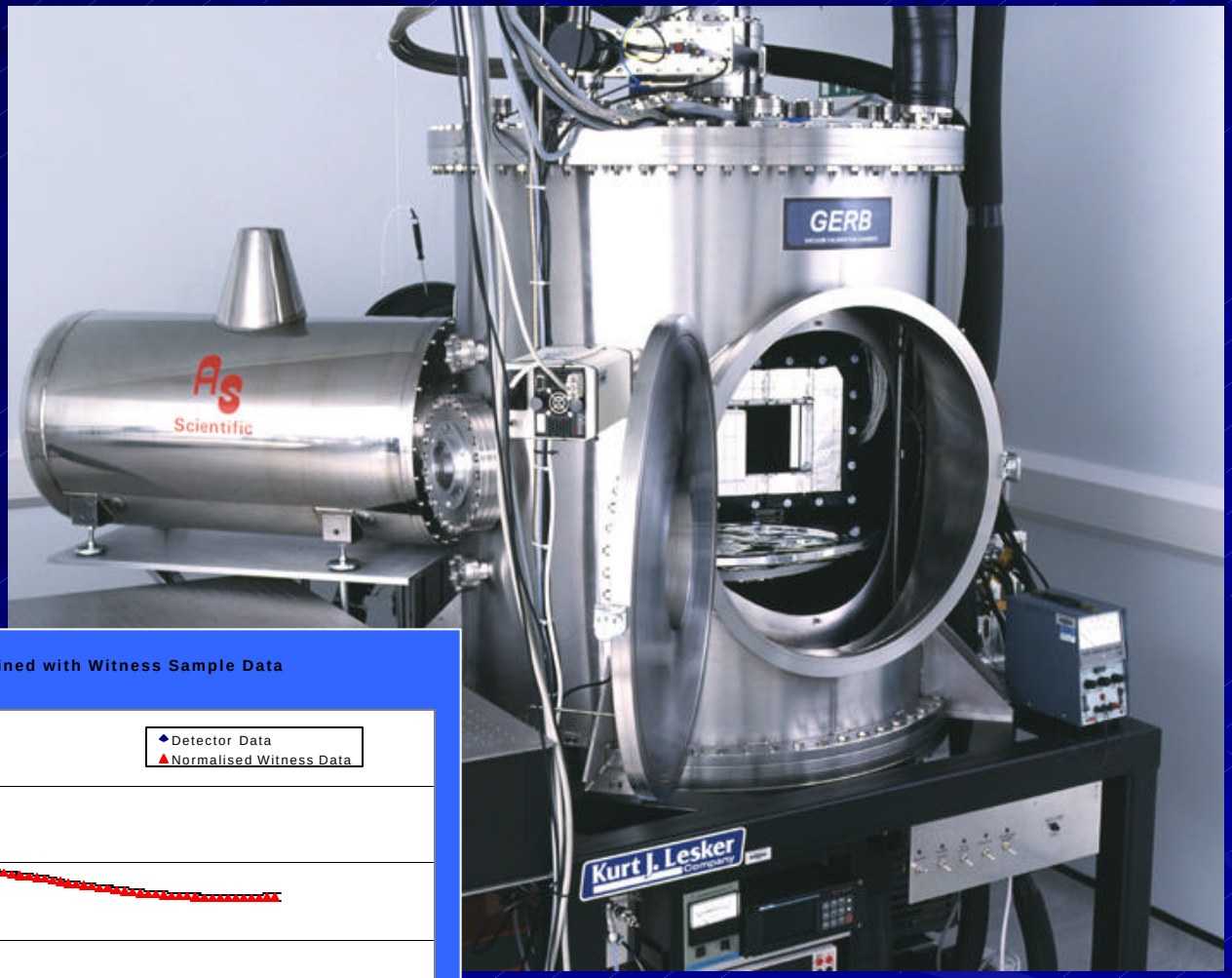

Array moves one pixel to west on every rotation of MSG, to build up image of 256x256 pixels
256 pixels

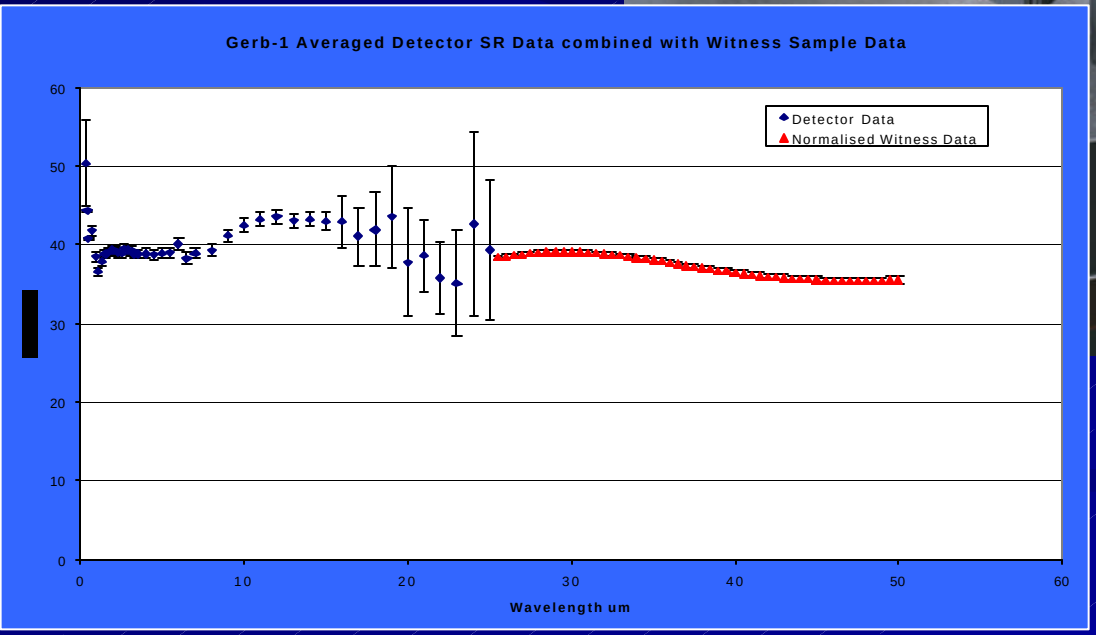
Diurnal Model Input not needed!



GERB Processing

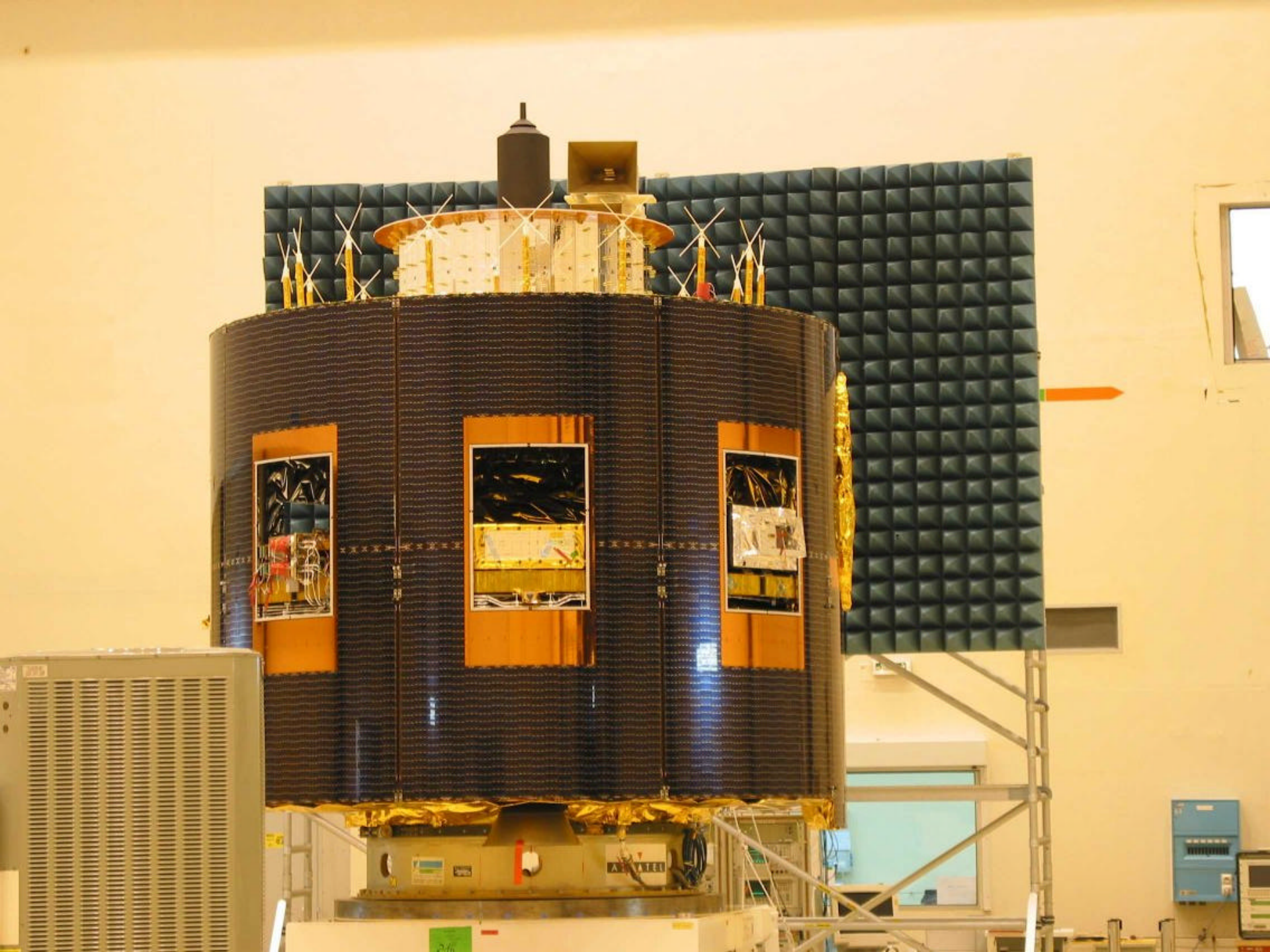
1. Measurements transmitted to RAL via EUMETSAT, where inflight gains are determined and applied to give Non Averaged Non Rectfified or Geolocated (NANRG) filtered radiances.
2. NANRG data Averaged, Rectified and Geolocated (ARG) to the MSG grid by RAL.
3. RMIB take NANRG data, unfilter it, apply CERES ADMs and resolution enhance with the use of narrowband high resolution SEVIRI data. Real time 15 minute Fluxes are then produced.


GERB
AS
Scientific
Kurt J. Lesker
Company


Gerb-1 Averaged Detector SR Data combined with Witness Sample Data
Detector Data
Normalised Witness Data
60
50
40
30
20
10
0
0
10
20
30
40
50
60
Wavelength um

Launch of MSG 1


Austrian Aerospace
CONVOI
EXCEPTIONNEL
60

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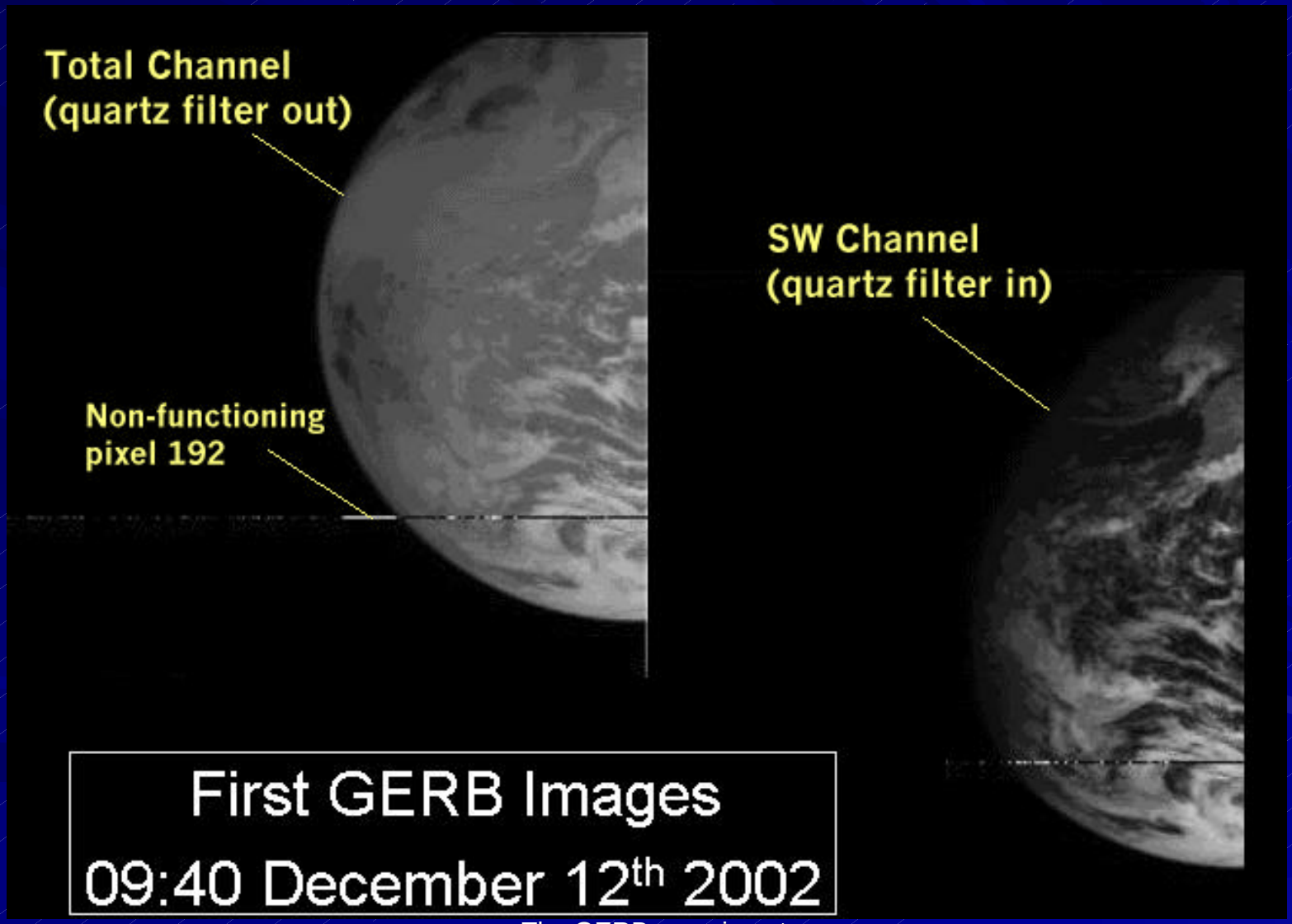
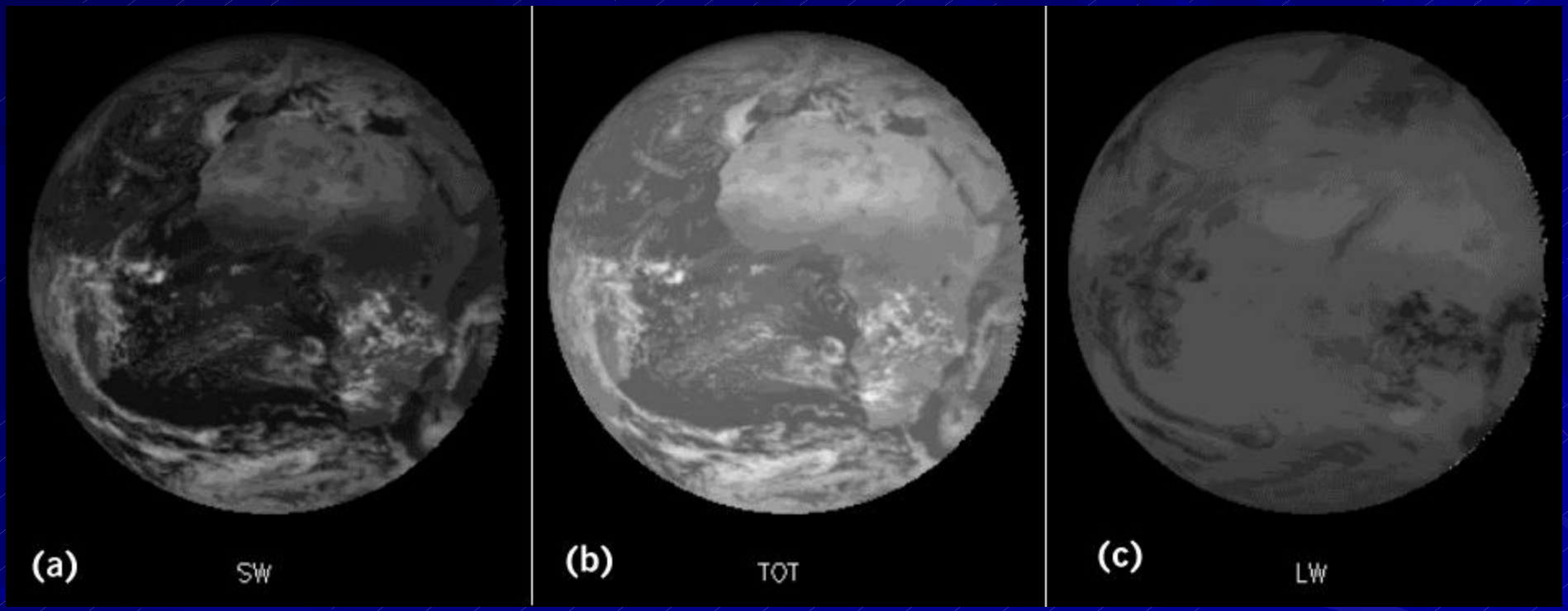
First GERB Data



First GERB Data



First GERB Data

Commissioning

•GERB, SEVIRI and MSG are currently operating well.

• MSG currently at 10.5° W and in Geo-synchronous orbit. Will soon be moved to Geostationary orbit above zero lat/long.

• Cross-calibration with CERES

• Optimisation of baseline calibration algorithms and geolocation techniques currently underway.

• Availability of realtime 15 minute Fluxes will be forthcoming.

Concluding remarks

- Congratulations to all the GERB team at Imperial, RAL, Leicester, NPL, in Italy, Belgium, Germany and USA
- Countering of MSG spin estimated to incur 0.03% (SW) and 0.1% (LW), a credit to the GERB design.
- GERB appears to be very successful suggesting great scientific benefits from multiple GERB and CERES programs in the future.